No. 17-71

In The
Supreme Court of the United States

WEYERHAEUSER COMPANY,

Petitioner,

v.

UNITED STATES FISH AND WILDLIFE SERVICE, et al.,

Respondents.

On Writ of Certiorari to the United States Court of Appeals for the Fifth Circuit

BRIEF FOR GOPHER FROG EXPERTS AS AMICI CURIAE SUPPORTING FEDERAL RESPONDENTS AND INTERVENOR-RESPONDENTS

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TABLE OF CONTENTS

Page

TABLE OF AUTHORITIES ii

INTERESTS OF AMICI CURIAE 1

SUMMARY OF ARGUMENT 6

ARGUMENT 7

I. The Dusky Gopher Frog is Critically Endangered 7

II. Unit 1 is Essential to the Conservation of the Dusky Gopher Frog 12

A. The Dusky Gopher Frog's Breeding Habitat is Rare 13

B. Habitat Geographically Remote from the Existing Gopher Frog Populations is Essential to the Conservation of the Species 16

C. The Unique Qualities of Unit 1 Make It Essential for the Conservation of the Dusky Gopher Frog 20

D. Unit 1 is Essential Despite Its Lack of Optimal Upland Habitat 23

CONCLUSION 27

TABLE OF AUTHORITIES

Page

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Page

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Page

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INTERESTS OF AMICI CURIAE[1]

Amici Curiae are herpetologists who research and study amphibians and reptiles, with a special emphasis on gopher frogs. They are some of the nation's top experts in amphibian ecology and retain a strong interest in the conservation of the dusky gopher frog. They consider the U.S. Fish and Wildlife Service's (FWS's) critical habitat designation of Unit 1 essential for the conservation of this species. More information about the specific interests and qualifications of the experts is provided below.

Dr. I. Brian Crother is an Edward G. Schlieder Professor in Environmental Studies and Sustainability and is the Assistant Dean of the College of Science and Technology at Southeastern Louisiana University. He coauthored (with Dr. Jeanne Young) the study that elevated *Rana sevosa* to a species and has coauthored other work on dusky gopher frogs. His over 100 publications mostly have covered the ecology and evolution of amphibians and reptiles, including specific long term surveys of amphibians and reptiles in southeastern Louisiana wetlands.

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[1] The parties' blanket consent to the filing of amicus briefs has been lodged with the Clerk of this Court. Pursuant to this Court's Rule 37.6, Amici Curiae certify that this brief was not authored in whole or in part by counsel for any party and that no person or entity other than Amici or their counsel made a monetary contribution intended to fund the preparation or submission of this brief.

Dr. C. Kenneth Dodd, Jr. received his Ph.D. in Zoology at Clemson University, Clemson, South Carolina, in 1974. Most of his career was with the U.S. Department of Interior: Office of Endangered Species 1976-1984 (as Staff Herpetologist) and the Research division of the U.S. Fish and Wildlife Service, later transferred to the U.S. Geological Survey (USGS; 1984–2007), where he served as Project Leader of the USGS Amphibian Research and Monitoring Initiative in the southeastern United States. He is currently Courtesy Associate Professor in the Department of Wildlife Ecology and Conservation at the University of Florida. Dr. Dodd has published more than 220 papers, reviews, and books, mostly on reptile and amphibian ecology, conservation, and management. His book *Frogs of the United States and Canada* was published by Johns Hopkins University Press in 2013, and an edited volume *Amphibian Ecology and Conservation: A Handbook of Techniques* was published by Oxford University Press in 2010.

Dr. Steve A. Johnson is an Associate Professor of Wildlife Ecology at the University of Florida in Gainesville. He holds a Ph.D. from the University of Florida and B.S. and M.S. degrees from the University of Central Florida. Dr. Johnson's area of expertise is natural history and conservation of amphibians and reptiles. Prior to his employment at UF, he worked as a Research Wildlife Biologist for the US Geological Survey's Amphibian Research and Monitoring Initiative. He and his students have studied gopher frogs in northern Florida for more than 20 years. In 2018, he

received the Paul Moler Herpetological Conservation Award for his career-long commitment to conservation of amphibians and reptiles.

Dr. Michael Lannoo is a professor at Indiana University and an affiliate of the Illinois Natural History Survey at the University of Illinois, and Purdue University. Over the past decade, he has published 29 papers on the biology of crawfish frogs (*Rana areolatus*), sister species to the gopher frog group. Subjects of these papers include natural history (burrow habitation, timing of breeding, breeding migrations, climate effects), ecology (demographics, metapopulation dynamics), population survey methods, genetics, disease, and colonization and use of post-industrial landscapes. In 2001, he received the Parker/Gentry Award for Excellence and Innovation in Conservation Biology from The Field Museum of Natural History, Chicago, IL. This award honors "an outstanding individual, team or organization whose efforts are distinctive and courageous and have had a significant impact on preserving the world's natural heritage, and whose actions and approaches can serve as a model to others."

Dr. Joseph C. Mitchell is currently a research associate with the Florida Museum of Natural History and partially retired. His Ph.D. is in ecology from the University of Tennessee. He owns his own environmental consulting business. He has worked on a wide array of conservation issues for the U.S. Forest Service, Fish and Wildlife Service, National Park Service, 20 Navy and Marine installations for the Department of Defense, The Nature Conservancy, and numerous private

environmental companies on private lands. Most of his 150 reports to these agencies are on conservation issues involving amphibians (frogs and salamanders). He served the NGO Partners in Amphibian and Reptile Conservation (PARC) Management Working Group as member and chair (2000–2009). He originated the acclaimed *Habitat Management Guidelines for Amphibians and Reptiles in the United States* series for PARC. He has written over 400 scientific articles, wildlife magazine articles, natural history notes, book reviews, and eight books.

Dr. Stephen C. Richter is a Professor of Biology and Associate Director of the Division of Natural Areas at Eastern Kentucky University. He has been studying gopher frogs since 1995, served as a peer reviewer for the FWS's critical habitat designation, and has published 16 of his 49 scientific papers and book chapters on the natural history, population genetics, and conservation biology of gopher frogs. He has co-taught courses on wetland restoration, and his primary research (13 publications to date) is heavily focused on wetlands, amphibians that require ephemeral wetlands for successful reproduction (similar to gopher frogs), and best management practices for wetland restoration.

Dr. Richard A. Seigel is Professor of Biology in the Department of Biological Sciences at Towson University in Maryland. He received his B.S. in Zoology & Physiology from Rutgers University, his M.S. in Biology from the University of Central Florida, and his

Ph.D. in Systematics and Ecology from the University of Kansas. His major research interests are in the population ecology and conservation biology of amphibians and reptiles, especially snakes, turtles, and frogs. He has published over 90 peer-revised papers and five books on the ecology and conservation of amphibians and reptiles and was named the winner of the 2013 Paul Moler Herpetological Conservation Award from the Florida Chapter of the Wildlife Society. He was the lead researcher on the ecological studies of the dusky gopher frog in Mississippi from 1995–2001.

Dr. William Sutton is an Assistant Professor of Wildlife Ecology at Tennessee State University in Nashville, Tennessee. Dr. Sutton's research program focuses primarily on the impacts of disturbance (natural and anthropogenic disturbances) on wildlife populations. His research also includes habitat modeling for rare and endangered species, such as amphibians and reptiles. In addition to his academic responsibilities, Dr. Sutton is involved with the Southeastern Partners in Amphibian and Reptile Conservation (SEPARC) and has served as the co-chair and long-term steering committee member. Dr. Sutton has worked with the dusky gopher frog in the context of evaluating the susceptibility of the species to amphibian pathogens, including ranaviruses.

Dr. Nikki Thurgate is a senior research fellow at La Trobe University. She holds a B.S. from James Cook University and a Ph.D. from the University of New Orleans. She has expertise in animal ecology and

management. She has worked on a number of endangered species globally to try to understand why certain species become extinct while others persist. Her Ph.D. research was on dusky gopher frogs in Mississippi (6 years) and she went on to work with gopher frogs in North Carolina for an additional 3 years.

Dr. Jeanne Young holds a B.S. from Louisiana State University, a M.S. from Southeastern Louisiana University and a Ph.D. from Charles Darwin University. She has expertise in ecological physiology and evolutionary biology of reptiles and amphibians. Her M.S. investigated reproduction, movement patterns and population genetics of gopher frogs. Her Ph.D. research investigated evolutionary and physiological correlates of ecology of hylid frogs in the Northern Territory of Australia.

SUMMARY OF ARGUMENT

The dusky gopher frog is at extremely high risk of extinction in the wild. With only one viable population in Mississippi facing a myriad of identifiable but unpredictable threats such as drought and disease, it is essential that populations outside of Mississippi be established. Unit 1 was home to dusky gopher frogs in the mid-1960s, is distant enough from the existing populations that it would likely be unaffected by events which pose a risk to the continued existence of the Mississippi populations, and contains the rare ephemeral

ponds which serve as breeding habitat for the dusky gopher frog. The rarity of these ponds in the dusky gopher frog's historical range and the difficulty of creating them render the ponds and their surrounding uplands essential for conservation of this species. Unit 1 also contains upland habitat, which, while not ideal, is nonetheless suitable for the dusky gopher frog and can be restored to optimal conditions.

ARGUMENT

I. The Dusky Gopher Frog is Critically Endangered.

The dusky gopher frog (also referred to as the Mississippi gopher frog), *Rana sevosa* (= *Lithobates sevosus*), historically occupied three states – Louisiana, Mississippi, and Alabama – and was once abundant in coastal Mississippi.[2] The species was historically fairly common in distribution, but a drastic loss of habitat

[2] AR 33 (M. Graham Netting & Coleman J. Goin, *Additional notes on Rana sevosa*, 1942 Copeia 259, 259); AR 963 (Michael A. Sisson, Monitoring Reproductive Activity of the Mississippi Gopher Frog and Evaluating Ponds for Suitability as Gopher Frog Release Sites 1 (2003)); AR 1552 (Stephen C. Richter et al., *Genetic Consequences of Population Reduction and Geographic Isolation in the Critically Endangered Frog, Rana sevosa*, 2009 Copeia 799, 801, 802).

has decimated the population.[3] Estimates at the time of the critical habitat designation number the total adult population at only approximately 100 individual frogs in Mississippi.[4]

Currently, a single viable population of the dusky gopher frog is known to exist, a natural population in a pond in the DeSoto National Forest in southern Mississippi known as Glen's Pond.[5] Recently, the Glen's Pond population has not thrived: in 2016 only 11 juvenile frogs were counted in surveys of Glen's Pond, and in 2017 surveys reflected that no natural juveniles were produced at Glen's Pond.[6] At the time of critical

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[3] Stephen C. Richter & John B. Jensen, *Rana sevosa Goin and Netting, 1940, in* Amphibian Declines 584, 584 (Michael Lannoo ed., Univ. of Cal. Press 2005), excerpt available at https://amphibiaweb.org/species/5939; AR 1243-1244 (Nicole Y. Thurgate & Joseph H.K. Pechmann, *Canopy Closure, Competition, and the Endangered Dusky Gopher Frog*, 71 J. Wildlife Mgmt. 1845, 1845-1846 (2007)).

[4] AR 2146 (U.S. Fish & Wildlife Service, Mississippi Gopher Frog Fact Sheet 2 (2012)). In its 2015 5-Year Review, FWS estimated the total number of adult frogs at that time to be 160, though the vast majority of those individuals – 135 – are reported as occurring in only one location: Glen's Pond. U.S. Fish and Wildlife Service, 5-Year Review: Summary and Evaluation 8-9 (2015) ("5-Year Review").

[5] *See* Joseph H.K. Pechmann et al., Research on Conservation and Recovery of the Endangered Dusky (Mississippi) Gopher Frog, Period of Performance: 1 January 2012–31 December 2016 3-4 (2017) (unpublished report, on file with the author); 5-Year Review at 3.

[6] Pechmann et al., *supra* note 5, at 3; Joseph H.K. Pechmann et al., Research on Conservation and Recovery of the Endangered Dusky (Mississippi) Gopher Frog, Period of Performance: 1

habitat designation, two other small, vulnerable populations existed in Mississippi near Glen's Pond: 1) Mike's Pond, the only known existing natural population outside of Glen's Pond, located approximately 20 miles east of Glen's Pond, and 2) McCoy's Pond, located approximately 16 miles east of Mike's Pond.[7]

The last remaining breeding population of dusky gopher frogs at Glen's Pond represents the only viable population within what was historically a complex metapopulation, which contained multiple connected populations with breeding wetlands across a landscape of continuous upland habitat.[8] FWS defines a viable population as "one that is large enough to maintain sufficient genetic variation to enable it to evolve and respond to natural habitat and environmental changes, and exhibits parameters consistent with a stable or increasing reproductive rate, without the addition of frogs raised in artificial environments or

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January 2017–22 February 2018 6 (unpublished report, on file with author).

[7] J.A. 148; *see also* 5-Year Review at 9 (citing distances between ponds). The population at McCoy's Pond is likely extinct. *Id.* ("No dusky gopher frogs have been observed at [McCoy's Pond] since a frog was heard calling there in 2004."). The population at Mike's Pond may be extinct as well. *Id.* (citing 2013 as last record of the frog at Mike's Pond); *see also* Pechmann et al., *supra* note 5. There are ongoing habitat restoration and gopher frog translocation efforts at several sites in Mississippi, including at a pond established by The Nature Conservancy, but none of these populations are established and self-sustaining. Pechmann et al., *supra* note 5.

[8] AR 1552, 1554 (Richter et al., *supra* note 2, at 802, 804).

introduced from other populations."[9] Dusky gopher frogs are pond breeding amphibians and each subpopulation is organized around a breeding pond and the adjoining upland habitat. Each subpopulation in turn interacts with the various adjoining subpopulations. The resulting network of connectivity between ponds and subpopulations establishes a metapopulation structure across the wider landscape.[10]

It is because of this very small total number of frogs with only one known viable population that the U.S. Fish and Wildlife Service correctly listed the species as Endangered under the U.S. Endangered Species Act, and the International Union for Conservation of Nature and Natural Resources (IUCN) listed it as Critically Endangered on its Red List.[11] A species is considered Critically Endangered when it is "facing an extremely high risk of extinction in the wild."[12] Data indicate that the dusky gopher frog is one of the most

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[9] 5-Year Review at 34.

[10] AR 1552 (Richter et al., *supra* note 2, at 802). FWS accurately states: "To be a viable population, a dusky gopher frog population must be a metapopulation." 5-Year Review at 34 (emphasis omitted).

[11] Final Rule to List the Mississippi Gopher Frog Distinct Population Segment of Dusky Gopher Frog as Endangered, 66 Fed. Reg. 62,993, 62,993 (Dec. 4, 2001); The IUCN Red List of Threatened Species, 2008, http://www.iucnredlist.org/static/categories_criteria_3_1 (last visited June 27, 2018).

[12] *Id.*

endangered, if not *the* most endangered, species of amphibian in the United States.[13]

The species faces a variety of threats, but FWS accurately found that the primary threat is the degradation, destruction, and fragmentation of suitable habitat.[14] As a terrestrial amphibian, the dusky gopher frog is especially vulnerable to alteration, loss, and fragmentation of habitat. Thus, FWS has appropriately focused on locating, protecting, and restoring suitable habitat.

While no dusky gopher frogs have been found in Louisiana since the mid-1960s or in Alabama since 1922, one of the last observed locations of the dusky gopher frog in Louisiana was within the critical habitat now designated by the FWS as Unit 1.[15]

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[13] AR 1662 (Richard A. Seigel, Comments (2011)); *see also* AR 1243 (Thurgate & Pechmann, *supra* note 3).

[14] 66 Fed. Reg. at 62,994.

[15] J.A. 167 (Designation of Critical Habitat for Dusky Gopher Frog Final Rule, 77 Fed. Reg. 35,118, 35,135 (June 12, 2012)) ("It is currently unoccupied; however, the last observation of a dusky gopher frog in Louisiana was in 1965 in one of the ponds within this unit."); *see also* AR 3098-3104; AR 1099, 1103 (Joseph H.K. Pechmann et al., Survey for Critically Imperiled (S1) Pond-Breeding Amphibians in St. Tammany Parish, Louisiana 10, 14 at Table 1 (2006)). An additional record from 1967 reflects the dusky gopher frog located in the same area as Unit 1: "Dusky Gopher Frogs were known from the flatwoods areas north of Lake Pontchartrain, from near Ponchatoula to Slidell, and north on the tableland west of the Pearl River to near Bush. They were last found in Louisiana in 1967 near Hickory, St. Tammany Parish, by graduate students from the University of Louisiana at Lafayette." Jeff Boundy & John L. Carr, Amphibians & Reptiles of Louisiana 138

II. Unit 1 is Essential to the Conservation of the Dusky Gopher Frog.

In 2011, FWS conducted a habitat assessment of the St. Tammany Parish, Louisiana, property ultimately designated as Unit 1 and found five ephemeral ponds and associated upland terrestrial habitat.[16] We agree with the FWS that the 1,544 acres in Unit 1 are essential for the conservation of the dusky gopher frog. FWS correctly concluded that the Unit 1 critical habitat is essential for the conservation of the dusky gopher frog based on its accurate findings that Unit 1 "provides: (1) breeding habitat for the dusky gopher frog in a landscape where the rarity of that habitat is a primary threat to the species; (2) a framework of breeding ponds that supports metapopulation structure important to the long-term survival of the dusky gopher frog; and (3) geographic distance from extant dusky gopher frog populations, which likely provides protection from environmental stochasticity."[17]

The ephemeral ponds located in Unit 1 represent the best remaining breeding habitat for the dusky gopher frog known to exist in Louisiana.[18] Further, the

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(La. State Univ. Press 2017); *see also* J.A. 127 (Alabama historical record).

[16] J.A. 160.

[17] J.A. 126. FWS uses the term "stochastic" to describe periodic natural events or existing or potential human-induced events. J.A. 157.

[18] J.A. 53 (Joseph H.K. Pechmann, Peer Review Comments (2011)) ("The critical habitat proposed in Unit 1 contains the best gopher frog habitat remaining in Louisiana, to my knowledge, and some of the best breeding ponds available anywhere in the

FWS was correct in concluding that "[b]ased on the best scientific information available to the Service, the five ponds in Unit 1 provide breeding habitat that in its totality is not known to be present elsewhere within the historic range of the dusky gopher frog."[19] It is indisputable that the dusky gopher frog was historically found in Unit 1 and that one of the last known locations of the frog in Louisiana was in a pond within Unit 1.[20] If reintroduced to Unit 1, these ponds would support dusky gopher frog reproduction.

A. The Dusky Gopher Frog's Breeding Habitat is Rare.

Adult dusky gopher frogs range in size from 56–105 mm (2.2–4 inches).[21] The dusky gopher frog breeds in small ephemeral ponds that lack fish, and it spends the majority of its life in and around underground burrows found in the upland forest habitat surrounding the breeding pond.[22] The ponds are referred to as

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historical range of *R. sevosa*. I strongly agree with the Service's determination that this area is essential for the conservation of *R. sevosa*.").

[19] J.A. 125; *see also* J.A. 160 ("In fact, no group of five ponds such as these was found in any of the areas of historical occurrence that we have searched in Mississippi.").

[20] AR 1099, 1103 (Pechmann et al., *supra* note 15); *see also* Boundy & Carr, *supra* note 15 and J.A. 160, 167.

[21] Richter & Jensen, *supra* note 3, at 585.

[22] 66 Fed. Reg. at 62,994; *see also* AR 870, 873 (Stephen C. Richter et al., *Postbreeding Movements of the Dark Gopher Frog, Rana sevosa Goin and Netting: Implications for Conservation and Management*, 35 J. Herpetology 316, 316, 319 (2001)).

ephemeral because they fill with water and completely dry out over a cyclical period of time.[23] Dusky gopher frog breeding ponds must be ephemeral and geographically isolated from other waterbodies in order to ensure the absence of predacious fish, which cannot survive the dry cycle of the pond.[24] The frog's breeding season is directly dependent on the hydrological cycle of the local ecosystem.[25] When seasonal winter rainfall sufficiently fills the shallow ephemeral ponds, the male frogs move to the ponds and call to the females.[26] In years without sufficient rainfall, the males will not move to the ponds and breeding typically will not occur.[27]

During breeding, females attach clusters of eggs to vertical emergent vegetation within the pond. After the breeding cycle, adult frogs return to upland

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[23] J.A. 151.

[24] *See* 66 Fed. Reg. at 62,999 ("Predation from fish probably contributed to the loss of historic populations. Temporary ponds altered to form more permanent bodies of water and stocked with fish are no longer suitable breeding sites.").

[25] J.A. 151.

[26] *See* AR 895 (Stephen C. Richter & Richard A. Seigel, *Annual Variation in the Population Ecology of the Endangered Gopher Frog, Rana sevosa Goin and Netting*, 2002 Copeia 962, 966); *see also* AR 945 (Stephen C. Richter et al., *Stochastic Variation in Reproductive Success of a Rare Frog, Rana sevosa: Implications for Conservation and for Monitoring Amphibian Populations*, 111 Biological Conservation 171, 172 (2003)).

[27] *See* AR 898 (Richter & Seigel, *supra* note 26, at 969); *see also* J.A. 52 (Joseph H.K. Pechmann, Peer Review Comments (2011)).

burrows.[28] Following metamorphosis, juvenile frogs also move to the burrows in the surrounding upland habitat.[29] The ephemeral ponds often dry by early to mid-summer. Frogs will remain in the upland habitat until the following breeding season.

Further, the dusky gopher frog requires that the ponds have an open canopy, and it uses emergent and submerged vegetation for egg attachment by female frogs.[30] Research suggests that open pond canopies are particularly important as this characteristic has a direct effect on tadpole development and metamorphosis.[31] Water in the pond must be free of pollution, suspended sediment, and road runoff as these impurities impair larval development.[32] The ephemeral pond must contain water for sufficient periods to allow adequate time for hatching, development, and metamorphosis of the larvae.[33]

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[28] 66 Fed. Reg. at 62,994.

[29] J.A. 150; *see also* AR 1412 (Elizabeth A. Roznik & Steve A. Johnson, *Burrow Use and Survival of Newly Metamorphosed Gopher Frogs (Rana capito)*, 43 J. Herpetology 431, 432 (2009)).

[30] AR 1248 (Thurgate & Pechmann, *supra* note 3, at 1850); Richter & Jensen, *supra* note 3, at 585.

[31] AR 1243 (Thurgate & Pechmann, *supra* note 3).

[32] J.A. 152 ("An unpolluted wetland with water free of predaceous fish, suspended sediment, pesticides, and chemicals associated with road runoff is important for egg development, tadpole growth and development, and successful mating and egg-laying by adult frogs.").

[33] J.A. 151, 153; *see also* AR 1243 (Thurgate & Pechmann, *supra* note 3, at 1845).

This combination of necessary features – ponds which retain the right amount of water for only limited days in the year, number several in a particular location, are isolated, contain vertical emergent vegetation, have an open canopy, and contain water free of pollution – is rare in the dusky gopher frog's historical range.[34] We agree with the FWS's focus on this element of the frog's habitat because "their rarity in the environment is one of the primary reasons that the frog is endangered."[35]

B. Habitat Geographically Remote from the Existing Gopher Frog Populations is Essential to the Conservation of the Species.

The gopher frog populations in Mississippi face a high risk of extinction from stochastic events – threats posed by disease and other events for which occurrences vary in space and time. These include, but are not limited to, events such as drought or flooding and genetic bottlenecks and inbreeding associated with low population sizes.[36] Due to the gopher frog's overall low

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[34] *See* J.A. 125 ("Isolated, ephemeral ponds that can be used as the focal point for establishing these populations are rare, and this is a limiting factor in dusky gopher frog recovery."); *see also id.* (describing unsuccessful searches for similar pond habitat in Alabama, described as unsuitable because the "ponds contained woody shrubs and trees, were occupied by fish, occurred within agricultural fields, and/or were surrounded by trailers and houses.").

[35] J.A. 158; *see also* J.A. 126.

[36] J.A. 115.

numbers and its isolation to a relatively small geographic area, these threats which are typically localized in impact thus loom large over the entire extant population; a single outbreak poses a risk of extinction.[37]

For example, in 2003 a majority of the dusky gopher frog tadpoles at Glen's Pond were killed by an unknown disease.[38] With only one breeding site, the disease effectively eliminated any population increase that would have occurred due to reproduction during the 2003 breeding season.[39] While this disease did not appear to impact adult dusky gopher frogs, it continues to be present in the Glen's Pond site.[40]

Drought and decreased rainfall threaten all life stages of the dusky gopher frog. The amount and timing of precipitation can have dramatic effects on ephemeral breeding ponds, even resulting in years where zero reproduction occurs.[41] Additionally, studies on the related *Rana* (= *Lithobates*) *capito* reflect a

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[37] *See* J.A. 52-53 (Pechmann, *supra* note 18 ("Due to the low number of remaining populations and its very restricted range, *R. sevosa* may be at risk of extirpation from events such as drought or disease which vary over space and time. Maintaining sites over the entire range of *R. sevosa* into which it could be translocated is essential to decrease the potential risk of extinction of the species from events such as these and provide for the species' eventual recovery.")).

[38] AR 967 (Sisson, *supra* note 2, at 5).

[39] *Id.*

[40] Pechmann et al., *supra* note 5, at 51-52.

[41] AR 1816 (Society for the Study of Amphibians and Reptiles (SSAR), Comments 2 (2011)); J.A. 126.

significant positive relationship between reproduction and rainfall during the breeding season.[42] Eggs and larvae are particularly vulnerable to desiccation (drying out) if sufficient water does not remain in the ponds, but changes in precipitation may also affect juvenile and adult survivorship in the frog's post-metamorphosis stage when it moves out of the breeding ponds into upland habitat.[43] Additionally, climate change poses a particular threat to the continued existence of the dusky gopher frog.[44] Climate change will have a heightened impact on dusky gopher frogs and other amphibians because they cannot easily disperse to areas with different climate regimes, especially given their limited dispersal distances and the barriers created by fragmented habitats.[45] Hydrological

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[42] AR 1531 (John B. Jensen et al., *The Relationship Between Breeding by the Gopher Frog, Rana capito (Amphibia: Ranidae) and Rainfall*, 150 Am. Midland Naturalist 185, 185 (2003)).

[43] Cynthia Carey & Michael A. Alexander, *Climate Change and Amphibian Declines: Is There a Link?*, 9 Diversity and Distributions 111, 114 (2003), https://www.researchgate.net/publication/230033657_Climate_change_and_amphibian_declines_Is_there_a_link ("Because most amphibians lay eggs in standing water, eggs and larvae are particularly vulnerable to desiccation.") (internal citation omitted); J.A. 126 and AR 1416 (Roznik & Johnson, *supra* note 29, at 435).

[44] AR 1469 (Joshua J. Lawler et al., *Projected Climate Impacts for the Amphibians of the Western Hemisphere*, 24 Conservation Biology 38, 38 (2010)); *see also* J.A. 126.

[45] Carey & Alexander, *supra* note 43 ("Because temperature and moisture have such pervasive effects on amphibian biology, including reproduction, and because of their limited mobility, amphibians should be relatively vulnerable to the effects of rapid climate change, compared to other terrestrial vertebrates.").

changes to any of the ponds at currently occupied sites could result in extinction of that population and threaten survival of the species.[46] Thus, as noted by peer reviewer Stephen Richter: "Multiple breeding ponds will provide variation in the length of time ponds hold water (hydroperiod) across the landscape and will increase probability that reproductive success occurs in one or more ponds in a given year."[47]

Because of the significant risk posed by drought, disease and other threats, restricting critical habitat designation to sites in Mississippi is not sufficient for conservation of the dusky gopher frog. We agree with peer reviewer Joseph Pechmann that "Potential *R. sevosa* translocation sites must be spread out over as wide a geographic area as possible because events such as droughts and disease tend to be spatially autocorrelated. Therefore, [the dusky gopher frog] will be less at risk of extinction if populations [] are established across its range in Louisiana and Alabama, rather

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[46] SSAR Comments, *supra* note 41, and J.A. 126; *see also* Richard A. Seigel et al., *Using Well Water to Increase Hydroperiod as a Management Option for Pond-Breeding Amphibians*, 34 Wildlife Soc. Bulletin 1022, 1025 (2006), https://doi.org/10.2193/0091-7648(2006)34[1022:UWWTIH]2.0.CO;2 ("When populations become isolated, as is true for dusky gopher frogs at Glen's Pond, the effects of annual reproductive failure escalate and can result in extinction of such isolated populations. When there are only a limited number of populations, such a local extinction may be unacceptable. In fact, *R. sevosa* appears susceptible to extinction following complete reproductive failure from 4 to 5 consecutive years of low rainfall.").

[47] AR 1541 (Stephen C. Richter, Peer Review Comments 3 (2010)).

than just in southern Mississippi."[48] As FWS noted in its Final Rule: "The scientific peer reviewers that responded to our original proposed critical habitat rule were united in their assessment that this proposal was inadequate for the conservation of the dusky gopher frog and that we should look within the species' historic range outside the state of Mississippi for additional habitat for the designation."[49]

In sum, the FWS correctly concluded that "Unit 1 is essential to the conservation of the dusky gopher frog because it provides . . . geographic distance from extant dusky gopher frog populations, which likely provides protection from environmental stochasticity."[50]

C. The Unique Qualities of Unit 1 Make It Essential for the Conservation of the Dusky Gopher Frog.

Ephemeral ponds are the product of a complex balance of hydrology and are difficult to artificially create.[51] FWS describes lengthy efforts it engaged in with

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[48] J.A. 53; *see also* J.A. 39 (Stephen C. Richter, Peer Review Comments (2011)) ("I applaud the proactive designation of multiple areas currently unoccupied by the species but that represent promising sites for reintroductions to what appear to be historic breeding ponds and surrounding uplands. These additional sites truly are essential to the conservation of the species.").

[49] J.A. 124.

[50] J.A. 126.

[51] Joseph H.K. Pechmann et al., *Amphibian Colonization and Use of Ponds Created for Trial Mitigation of Wetland Loss*, 21

the U.S. Forest Service to create a single ephemeral pond in the DeSoto National Forest, explaining: "It has taken 10 years to reach the point where we consider this pond ready to be used as a reintroduction site, and its value as a breeding site has not yet been proven."[52] We agree with the FWS that "[i]t is highly unlikely that five ponds, similar to those that currently exist in Unit 1, could be created in the landscape within a timeframe that would provide near-term conservation benefits to the dusky gopher frog."[53]

Thus, the existence and excellent condition of the five ephemeral ponds in Unit 1 render it essential for the conservation of the dusky gopher frog. The ponds are ephemeral and geographically isolated from other water sources.[54] As such, they can serve as breeding habitat and a predator-free site for the larvae and tadpoles to develop. The ponds are open canopied with

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Wetlands 93, 96, 106-107 (2001), https://srelherp.uga.edu/projects/docs/rbay/RefugePonds-2001.pdf (describing initial difficulty in achieving water retention in created pond; that problem was resolved by the installation of a plastic liner, which then made the pond permanent rather than ephemeral); Charlene D'Avanzo, *Long-Term Evaluation of Wetland Creation Projects*, *in* 2 Perspectives, Wetland Creation and Restoration: The Status of the Science 75, 75 (John A. Kusler and Mary E. Kentula eds., USEPA 1989), https://www.epa.gov/sites/production/files/2015-08/documents/wetland_creation_and_restoration_-_the_status_of_the_science_vol_2_1.pdf.

[52] J.A. 122-123. This constructed pond has yet to support a viable population. 5-Year Review at 3, 9-10.

[53] J.A. 123.

[54] J.A. 123, 125.

good water quality.[55] Surveys in the 1990s and 2000s noted that the ephemeral ponds in what is now Unit 1 were "considered similar in appearance (water clarity, depth, vegetation) to ponds in Mississippi used for breeding by the dusky gopher frog."[56] In 2011, FWS conducted a habitat assessment of Unit 1 and concluded that the five ephemeral ponds were "intact and remarkable quality" and "determined that [the] five isolated, ephemeral wetlands in that area are similar to ponds where dusky gopher frogs currently breed in Mississippi."[57]

Of equal importance to the high quality of Unit 1's ephemeral ponds is the existence of several of them within close proximity of one another. The FWS was correct in concluding that "the five ponds are in close enough proximity to each other that adult frogs could move between them and create a metapopulation."[58] This network of five ponds would support separate

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[55] AR 1097 (Pechmann et al., *supra* note 6, at 8 ("Water quality is good in all seven ponds we measured it in. . . ."); *id.* at 1099 (noting that "open canopy temporary ponds are very rare. The few open canopy ponds we surveyed included the two historic sites for *R. sevosa* we were able to locate.").

[56] J.A. 160 (citing Robert A. Thomas & Amelia G. Ballew, *Survey for Dusky Gopher Frog (Rana capito sevosa), Populations in St. Tammany Parish, Louisiana: 1996-1997* (1997); Norman E. Leonard et al., *Survey for Rana sevosa and Abystoma tigrinum, Two Critically Imperiled (S1) Pond-Breeding Amphibians in St. Tammany Parish, Louisiana* (2003); and Joseph H.K. Pechmann et al., *Survey for Critical Imperiled (S1) Pond-Breeding Amphibians in St. Tammany Parish, Louisiana* (2006)).

[57] J.A. 124-125, 160.

[58] J.A. 167.

breeding subpopulations and could result in the emergence of a metapopulation within the geographic area of Unit 1.[59] Outside of Glen's Pond, this framework is unique within the historical range of the dusky gopher frog and, therefore, essential.[60]

D. Unit 1 is Essential Despite Its Lack of Optimal Upland Habitat.

The FWS correctly identified upland forested nonbreeding habitat and upland habitat connecting the breeding and nonbreeding habitat as primary elements of dusky gopher frog habitat.[61] Unit 1 possesses upland forest nonbreeding habitat and connectivity habitat, though not in optimal conditions.

Essentially, as FWS stated, the frog's upland nonbreeding habitat must provide for "food, shelter, and protection from the elements and predation."[62] Traditionally, the dusky gopher frog's upland habitat consisted of longleaf pine savannah, and this remains optimal for the frog's upland habitat, leading FWS to describe the existing loblolly pine plantation upland

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[59] *Id.*; *see also* AR 1664 (Joseph C. Mitchell, Comments 1 (2011)).

[60] J.A. 125. The cattle watering tanks being used to artificially raise tadpoles to metamorphosis are not a replacement for the ephemeral pond breeding habitat. These tanks can only be used in conjunction with wild breeding ponds, where scientists gather the frog eggs and ultimately release the metamorphs. *See* 5-Year Review at 7.

[61] J.A. 153-154.

[62] *Id.* at 153.

habitat on Unit 1 as poor quality terrestrial habitat.[63] However, FWS also accurately concluded that the Unit 1 uplands are restorable to longleaf pine with reasonable effort.[64]

Further, even in its current state, Unit 1's uplands could provide the necessary food, shelter, and protection from the elements and predation that the dusky gopher frog requires. In other words, it is currently suitable upland habitat. First, evidence indicates that Unit 1 already has stump holes, which the frog uses for shelter from predators and protection from desiccation and extreme temperatures. Dr. Joseph Pechmann's field notes from his Unit 1 site visit in 2011 identified the existence of "some stumps and stump holes around pond."[65]

Second, a number of sources document gopher frogs living on less than ideal upland habitat, including pine plantations. A report produced by the National Council for Air and Stream Improvement found that the Carolina gopher frog – *Rana capito* – was present at 17 ponds on forest industry lands, i.e., pine plantations.[66] The report stated: "Gopher frogs (17

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[63] *Id.* at 160.

[64] *Id.* at 167.

[65] AR 3101; *see also* J.A. 14. A 1997 survey also noted the presence of armadillo burrows on the Unit 1 uplands, which the researchers indicated "should substitute." AR 559 (Thomas & Ballew, *supra* note 56, at 6).

[66] National Council for Air and Stream Improvement, Final Report, Southeast Coastal Plain Amphibian Survey, NFWF

ponds) were not common [on forest industry lands], but were identified at ponds more often than some other species perceived as relatively common."[67] *Rana capito* has also been documented to live on intensely managed Florida pine plantations, albeit at significantly lower levels than on adjacent national forest lands.[68] This demonstrates that commercial pine plantations can serve as terrestrial habitat for *Rana capito*, although they would not be considered optimal habitat for this species either. *Rana sevosa* and *R. capito* are closely related sister species which have very similar habitat requirements.[69] Beyond pine plantations, *Rana capito* has also been documented living in heterogeneous upland habitat that includes fire-suppressed, closed-canopy pines clumped together near breeding ponds.[70] The study documented juvenile frogs moving from breeding ponds to both open-canopy

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Project #97-074 (1999) Table 2 (unpublished report, on file with author).

[67] *Id.* at 33.

[68] D. Bruce Means & Ryan C. Means, *Effects of Sand Pine Silviculture on Pond-breeding Amphibians in the Woodville Karst Plain of North Florida, in* Amphibians and Reptiles: Status and Conservation in Florida 56, 58 (Walter E. Meshaka & Kimberly J. Babbitt, eds., Krieger Publishing Co. 2005).

[69] Richter & Jensen, *supra* note 3; *see also* AR 1412 (Roznik & Johnson, *supra* note 29, at 431).

[70] AR 1413, 1416 (Roznik & Johnson, *supra* note 29, at 432, 435).

and closed-canopy upland areas; juveniles from both groups survived.[71]

Third, the fact that the dusky gopher frog was documented in Unit 1 twice in the mid-1960s demonstrates that the dusky gopher frog persisted in Unit 1 for decades while it was a pine plantation.[72] Indeed, the authors of a 1997 survey of the land now designated as Unit 1, who viewed the ponds and their surrounding upland habitat, commented: "There is no reason to believe that the land cannot support Dusky Gopher Frogs."[73] The authors of a 2006 survey of St. Tammany Parish ponds, which included Unit 1, stated the following regarding the near universal presence of pine plantations at all the St. Tammany sites: "[I]t is likely that pine plantations represent a type of land use far more preferable to amphibians than residential housing or more intensive types of agriculture."[74]

Finally, because all but two percent of the original longleaf pine forests within the historic range of the frog have been destroyed, FWS must find and restore

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[71] AR at 1413-1414, 1416. In fact, although juvenile *Rana capito* frogs prefer open-canopy upland habitat, the study reflected that the survival rate was higher for the juveniles in the closed-canopy upland habitat over those in the open canopy uplands. *Id.* at 1415-1417.

[72] J.A. 167; *see also* AR 3098-3104; Boundy & Carr, *supra* note 15; and J.A. 32 (P&F Lumber, Comment (2011) (noting that the Poitevent patriarch acquired the property in the 1880s and formed a lumber company)).

[73] AR 557 (Thomas & Ballew, *supra* note 56, at 4).

[74] AR 936 (Leonard et al., *supra* note 56, at 6).

degraded upland habitats if the dusky gopher frog is to recover.[75] Therefore, while the upland habitat in Unit 1 may not be ideal, it contains elements required by the dusky gopher frog, and those elements in less than optimal condition are restorable with a reasonable effort.

CONCLUSION

This Court should affirm the judgment of the United States Court of Appeals for the Fifth Circuit upholding FWS's designation of Unit 1 as critical habitat, as Unit 1 is essential for the conservation of the dusky gopher frog.

Respectfully submitted this 6th day of July, 2018,

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[75] *See* 66 Fed. Reg. at 62,995.